

Assignment: Volume -2

Date _____

For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the x -axis.

1) $y = 2\sqrt{\cos x}$, $y = 0$, $x = -\frac{\pi}{4}$, $x = \frac{\pi}{6}$

2) $y = \sec x$, $y = 0$, $x = -\frac{\pi}{3}$, $x = 0$

3) $y = -x^2 + 5$, $y = -x + 3$

4) $y = \sqrt{x+1}$, $y = x^2 + 1$

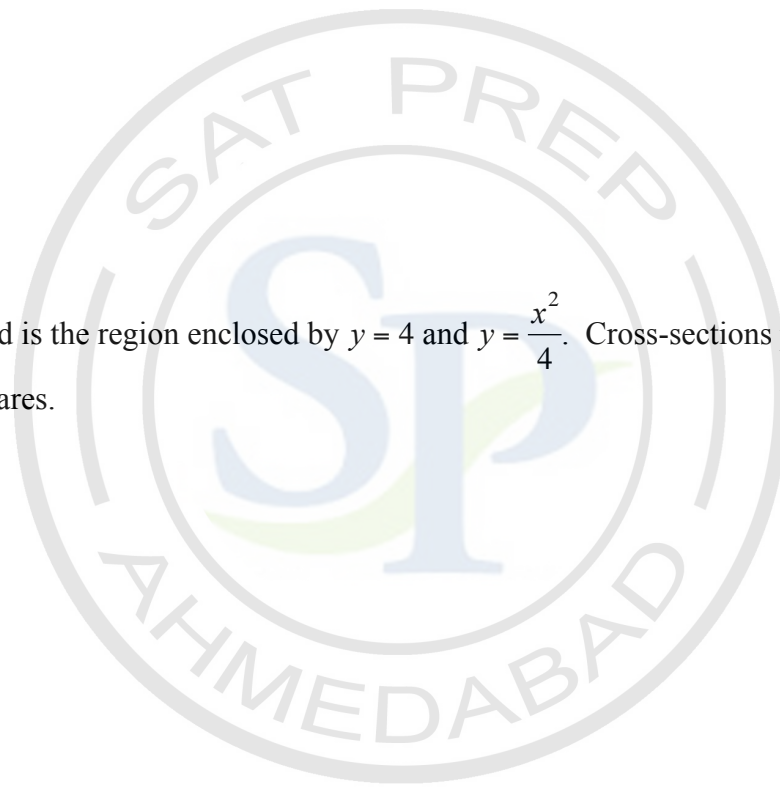
5) $y = 2$, $y = \sqrt{\cos x}$, $x = -\frac{\pi}{2}$, $x = 0$

6) $y = 2\sec x$, $y = \sec x$, $x = 0$, $x = \frac{\pi}{4}$

For each problem, find the volume of the specified solid.

- 7) The base of a solid is the region enclosed by the semicircle $y = \sqrt{9 - x^2}$ and the x -axis. Cross-sections perpendicular to the x -axis are squares.

- 8) The base of a solid is the region enclosed by the semicircle $y = \sqrt{9 - x^2}$ and the x -axis. Cross-sections perpendicular to the x -axis are rectangles with heights half that of the side in the x - y -plane.
- 9) The base of a solid is the region enclosed by $y = 4$ and $y = \frac{x^2}{9}$. Cross-sections perpendicular to the x -axis are squares.
- 10) The base of a solid is the region enclosed by $y = 4$ and $y = \frac{x^2}{4}$. Cross-sections perpendicular to the x -axis are squares.



Answers to Assignment: Volume -2

$$1) \pi \int_{-\frac{\pi}{4}}^{\frac{\pi}{6}} (2\sqrt{\cos x})^2 dx$$

$$= (2 + 2\sqrt{2})\pi \approx 15.169$$

$$2) \pi \int_{-\frac{\pi}{3}}^0 \sec^2 x dx$$

$$= \sqrt{3} \cdot \pi \approx 5.441$$

$$3) \pi \int_{-1}^2 ((-x^2 + 5)^2 - (-x + 3)^2) dx$$

$$= \frac{153}{5}\pi \approx 96.133$$

$$4) \pi \int_0^1 ((\sqrt{x} + 1)^2 - (x^2 + 1)^2) dx$$

$$= \frac{29}{30}\pi \approx 3.037$$

$$5) \pi \int_{-\frac{\pi}{2}}^0 (2^2 - (\sqrt{\cos x})^2) dx$$

$$= (2\pi - 1)\pi \approx 16.598$$

$$6) \pi \int_0^{\frac{\pi}{4}} ((2\sec x)^2 - \sec^2 x) dx$$

$$= 3\pi \approx 9.425$$

$$7) \int_{-3}^3 (\sqrt{9 - x^2})^2 dx$$

$$= 36$$

$$8) \frac{1}{2} \int_{-3}^3 (\sqrt{9 - x^2})^2 dx$$

$$= 18$$

$$9) \int_{-6}^6 \left(4 - \frac{x^2}{9}\right)^2 dx$$

$$= \frac{512}{5} = 102.4$$

$$10) \int_{-4}^4 \left(4 - \frac{x^2}{4}\right)^2 dx$$

$$= \frac{1024}{15} \approx 68.267$$